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ABSTRACT

The syntactic properties of the child's language are studied. Within the framework of transformational grammar, the rules of syntax can be divided into three types: base- or phrase-structure rules, transformational rules, and morphological rules. Each of these rules is discussed. It is stated that the one process that appears to characterize each of these syntactic rules (and language acquisition, in general) is that of "gradual differentiation." Implications for the teacher of the study of the child's language acquisition are presented. (Author/LS)

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The Language Code of the Child

Joseph A. DeVito and Jean M. Civikly

Given: By the age of five, the child is generally in command of the language rules of his particular linguistic environment. He can produce hundreds of sentences, the majority of which are meaningful and grammatical (Baratz, 1970).

Question: How has this occurred? Has the child learned it? Inherited it? Is it pure intuition, or some mystical osmotic process?

An accurate description of the development of language is a feat that has yet to be accomplished. Undoubtedly, understanding of language development has made rapid strides in the last decade, but the concern has been more with what is acquired rather than how language acquisition takes place.

In a general way, language acquisition can be described as the system whereby sound and meaning are related to each other. Between sound and meaning stands syntax, the language code. Thus, the relationship between sound and meaning is understood to the degree that the syntax of a language is understood.

As illustrated in the earlier discussion of competence and performance, the linguist is primarily concerned with competence. He seeks to discover the grammar which enables the child to generate sentences which have phonetic representations and semantic interpretations. It is interesting to note that while pronunciations and word meanings change rather frequently, the syntactical rules remain relatively systematic and steady. Language does have rules, and the grammar is the collection of these rules. The rules of the grammar of communication, in our case,

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English, influence both the transmission and reception of messages. Messages which are not formed in accordance with the rules of the code will be misunderstood to the extent that they deviate from these rules. Since miscommunication is not the goal of either teachers or students, it would seam a worthwhile task to study what that code is, how it has developed in the child, and the implications it holds for the classroom teacher.

Ideally, this grammar we are seeking will generate all the grammatical sentences of the language, and none of the ungrammatical sentences. It is only with a knowledge of the syntactic rules that the child can understand and produce sentences appropriate to his language. In other words, the rules are actually generalizations about language which permit the child, among other things, to evaluate the grammaticality of any novel sentence (Thomas, 1965). In any human language, the number of possible sentences is infinite. The child somehow acquires some method for understanding completely novel sentences never heard or spoken before--some device to determine all of the sentences. The syntax or code of a language can be viewed as that device for specifying this infinite set of sentences.

Since we are interested in a generalized explanation of constructions which are similar in meaning but not identical in form, the theoretical framework in which we will couch this discussion of the child's language code is Chomsky's transformational-generative approach (1957,1965).

In a transformational grammar, three components are specified: syntactic, semantic, and phonological. Since the purpose of this paper is to study the syntactical properties of the child's language, and not to analyze in depth the intricacies of transformational grammar, a diagram of the general outline of transformational grammar will be sufficient to

illustrate the relationship of the three components.

Figure 1. About Here

The syntactic component is the generative portion of the grammar. It provides the structural description for the elements which will serve as input to the sound system (phonological component) and the meaning system (semantic component). The correspondence between the representation (phonology) and the interpretation (semantics) of a sentence is specified by the rules of syntax.

But <u>how</u> exactly are these rules--this language code--learned? Think back. How did <u>you</u> learn them? Was it in the first grade, or fourth grade, or high school? Was it from your mother, or your older brothers and sisters? Well, if you nodded you head on the last two possibilities, you were close, but not quite on target. Indications from developmental psycholinguistic research (McNeill, 1970; Williams, 1971) are that the child is somehow <u>predisposed</u> to acquire language, that is, the rules for generating sentences. McNeill's nativistic theory states that the child has an <u>innate capacity</u> to become a "language-understanding and language-generating organism." It seems that the child cannot <u>avoid</u> learning the rules of his language.

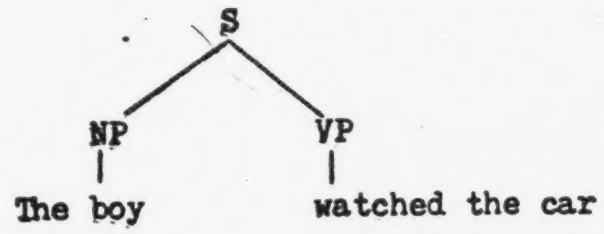
Transformational grammar does not have any objections to relying on intuition for developing linguistic thoery. In fact, transformational grammar insists that such reliance is a necessary prelude to the formulation of grammatical rules (Thomas, 1965). In discussing the language code of the child within the framework of transformational grammar, the rules of syntax can be divided into three types: base- or phrase-structure rules, transformational rules, and morphological rules.

The one process which appears to characterize each of these syntactic rules (and language acquisition, in general) is that of gradual differentiation. That is, the child seems first to acquire gross or general rules of language and gradually differentiates these into more refined and specific ones until the level of differentiation which characterizes adult speech and language is reached. This differentiation process will be evident in each of the syntactic components we shall discuss.

The base- or phrase-structure rules for a simplified grammar appear in Table 1. (S = sentence, NP = noun phrase, VP = verb phrase, det = determiner, N = noun, V = verb, aux = auxiliary, and past = past tense.)

Table 1. About Here

The rules are actually instructions to rewrite the left-hand side as the right-hand side of the arrow. For example, Rule 1 instructs one to rewrite the sentence as a noun phrase and a verb phrase. This can be illustrated by using a tree diagram:



These phrase-structure rules produce what are referred to as deep structures. In turn, these deep structures will serve as the input to the semantic component of the grammar which provides a semantic interpretation or meaning of the sentence.

One might say however, that even the sentence used in the above example is a big step for a child, and this observation is correct and justified. However, this process of rewriting rules can be seen early in

the child's acquisition of syntax.

One of the most striking characteristics of early language is that one word is used to mean a number of different things. These one-word sentences--called holophrases--contain the meaning of what adults would normally express in an entire sentence. The word mama, for example, might mean "Mama, I'm wet" or "Mama is gone" or "Mama, come here." The child's grammar at this stage could be expressed as the phrase-structure rewrite rule S$\longrightarrow$W, that is, rewrite sentence as word.

If one objects to calling these one-word utterances a grammar, they should be cautioned not to judge the child's language by adult standards. The child is not abbreviating well-formed adult sentences. While he has a simpler grammar, there are grammatical relations in these single words. The difficulty lies not with the child (who is gradually differentiating his language), but with the adult who must strive to be an accurate analyzer of the situation so that the correct interpretation is made.

Continuing in the child's process of differentiation, most researchers in psycholinguistics point to the development of what Martin Braine (1963a, 1963b) has referred to as pivot words. These words, few in number, are used by the child as pivots or fixing points around which his sentences become organized. For example, the word it might be a pivot word and to it the child will attach other terms, called open-class words, to produce such sentences as "Eat it," "Drink it," "Have it," "want it," and so forth. The pivots, then, are the cores around which the child builds his earliest sentences.

The pivot words and the open-calss words, or nonpivots, are breakdowns from the initial one-word sentences. The single word, used previously as an entire sentence, is here differentiated into pivots and nonpivots. The rewrite rule which might be used to express the grammar would be

S ⟶ P + O, or S ⟶ O + P, that is, rewrite sentence as pivot plus open-class, or open-class plus pivot.

At the next stage, there is further differentiation of the open-class word, generally into a modifier, as yet undifferentiated as to type, and a noun. The rule of the child's grammar here would be S ⟶ P + M + N, that is, rewrite sentence as pivot word plus modifier plus noun. With this grammar the child would produce such sentences as "It a boy," "It a sock," and "It a dogs." At a later stage of development, these modifiers are differentiated and the ungrammatical sentences gradually diminish in frequency.

The second aspect of the child's acquisition of his language code involves the mastery of transformational rules which enable him to produce complex structures from the more basic ones generated by the phrase-structure rules. The transformational rules can be specified in four operations: substitution, addition, deletion, and permutation. From these operations on the phrase-structure rules, that is, the deep structures, surface structures are derived. These surface structures, in turn, serve as input to the phonological component which assigns to them a phonetic representation. Had we used all seven phrase-structure rules of Table 1 for "The boy watched the car," the resulting tree diagram would be the following:

Figure 2. About Here

From the deep structure of this sentence then, one transformational rule would be needed to produce the surface structure asked: past watch ⟶ watched.

To clarify the deep and surface distinctions, one can generally follow a rule of thumb: The deep or underlying structure (phrase-structure) is associated with meaning or content. The surface structure is associated with sound or expression. The phrase-structure rules define the elements

within a sentence (car is a NP), and establishes the basic order of them. Information of this kind is essential for obtaining the meaning of the sentence. The transformation, in contrast, makes no contribution to meaning. It exists only because sound and meaning are not identical in English (or any language), and its sole purpose is to state the relations between them (McNeill, 1970).

From studies in universals of language (Greenberg, 1963), it appears that every language has the same basic grammatical categories arranged in the same way--sentences, NPs, VPs, etc. Every language utilizes the same grammatical relationships. The grammatical relationships of the holophrastic phase already define a basic part of the abstract underlying structure of sentences. This structure is therefore present at an early point in development. What changes is the child's method of expressing the underlying structures, followed by simple pivot-Open class combinations, then more complex combinations. There is a constant elaboration of the relation between the underlying structure and surface structures of sentences, that is, a constant elaboration of the transformational structure. (McNeill, 1970).

If one agrees that the child has some innate capacity to acquire syntax, then it should be no surprise that pinpointing the appearance of transformational rules is a difficult task. The procedure that has been followed to obtain some information on the inception of the transformational rules has been to study one process, for example, the child's acquisition of negatives (Klima and Bellugi, 1966) or of interrogatives (Bellugi, 1965). Although the details of these processes are beyond the scope of this paper, the general pattern of differentiation should not be overlooked. From Bellugi's study one can trace the development of interrogatives. It begins with the gross distinction between falling intonation, characteristic of declaratives, and rising intonation, characteristic of questions. Later

the distinguishing characteristic of question-words is introduced, and still later the process of inversion is added. Here, as in the case of other linguistic levels, a particular grammatical rule is first acquired --with only general and gross features. As the child develops, the features become more and more finely discriminated until they parallel the adult grammar of questions with auxiliary, wh-question, third-person singular present tense, and past tense morpheme.

While there are some universal transformations (approximately six), the specific forms of the various transformations are, of course, features which vary from language to language. It is necessary therefore for the child to learn these transformations from his linguistic environment (DeVito, 1970). Although it is not entirely clear how the child secures the data on the basis of which he acquires the necessary rules, it appears that part of the data comes from the mother's expansions of his own sentences. Roger Brown and his colleagues (Brown and Bellugi, 1964; Brown and Frazer, 1963; Brown, 1965) have provided considerable insight into this question. In expanding the child's sentences, the adult provides the child not only with examples of transformations but also with data on the basis of which he can revise or reject his tentative rules or theory of language structure. On the basis of data such as these and probably much else, the child acquires his transformational rules and is able to test whatever rules he has developed.

In concluding our discussion of transformational rules, an interesting hypothesis concerning the child's discovery of transformations has been proposed by McNeill (1970). He postulates that for this discovery to occur, "a strange interpersonal contiguity" must be brought about.

> The contiguity is this: To observe a transformational relation not yet known, an underlying structure that comes only from the child must be made contiguous with a surface structure that comes only from an adult. In other words, something in the child's

> mind must be brought together with something in the adult's speech. This contiguity must exist to understand a transformational relation as well as to produce one.

From an analysis of expansions, prompts, and imitations, it is obvious that contiguity is not the only factor determining the acquisition of transformations. Although we do not yet know the other factors, we do know that the child ultimately settles on a theory which enables him to understand and generate all the grammatical sentences of his language.

The third aspect to consider in the acquisition of syntax is the child's morphological rules. Just as he did in the case of the phrase-structure and transformational components, the child again acquires rules and not a simple list of permissible and non-permissible sequences (which would be extremely long.) Evidence of this can be obtained from observations of child utterances at different ages. First, the child can be observed to inflect forms, apply the rules of morphology for past tense (walkt, calld foldəd) or plural (cats, dogz, dishəs), which they have never seen or heard before. Their inflections clearly follow the rules of English morphology. Thus, when confronted with a novel word, say rit, the child knows that more than one of them is rits and not ritz or ritəz. Second, and perhaps more convincing, the child also follows these rules in inflecting irregular forms. For example, when they say drinked instead of drank, they are clearly following the morphological rules of English, though in this particular case, an incorrect structure is produced. In an investigation of English morphology, Jean Berko (1958) tested two groups of children who were ages four to five and a second group who was five-and-a-half to seven years old. Most children were able to supply the allomorphs -s and -z in forming plurals, possessives, and third-person singular verbs, but were unable to utilize the -əz allomorph. In the formation of the past tense, most children were

able to supply the -t and -d allomorphs, but were unable to supply the -ed ending. Of eighty children tested, only one child was able to supply the correct comparative and superlative endings for the adjectives. It appears from this study then that the hypothesis for the gradual differentiation of language rules is again supported. That at this stage of development these children had allomorphs which were not as finely differentiated as they are in adult morphology is obvious from the evidence on the plural, possessive, third-person singular verbs, and past tense morphemes.

In his discussion of morphology, McNeill (1970) makes an interesting observation which pertains to education. Having considered English and Russian development of morphology, it appears that public education in a society is withheld until the child has mastered morphology. English, which poses relatively few problems, is largely mastered by four or five years. Schooling begins at five or six. Russian, on the other hand, poses many more problems, and is not mastered until seven or eight years of age. Schooling begins at seven. "The intellectual readiness of the child for school apparantly has traditionally been judged by their mastery of the peripheral morphology of language."(McNeill, 1970, p. 84)

This is not the only implication that the study of the child's language code has for education however. Moving from the international aspects to the study of the individual classroom, other considerations can be made.

Working with the assumption that the child has an innate capacity to acquire language, the teacher should be able to ascertain at what particular level of differentiation her students appear to be. If she notes that one or a few children do not exhibit behaviors indicative of that level, she can now consider if this is a pathological language problem or if the child has not yet reached that level in his maturational development.

In determining this, the teacher would be wise to collaborate with the school psychologist and/or speech and language therapist. In this situation one should note that it is the teacher who must initiate this question. If she does not recognize a difference in her students, the therapist may never determine if there is any cause for further investigation.

A second implication founded on this assumption of innate ability to acquire language is that the teacher will be able to distinguish speech behaviors which can be changed, and when the prime time for change is. In addition, the teacher can also determine those behaviors on which she should not expend energy, since they are in the process of becoming differentiated. For example, she should not attempt to teach complex syntactic structures to the pre-school child who has yet to make those distinctions. Knowing that her efforts will be of little significant value should save many hours of preparation and frustration.

A third implication of the innate-genetic aspect of the acquisition of language is that teachers need to take into account where the child falls in the "maturational timetable" when developing and administering programs of speech "improvement" and the learning of new languages (Williams, 1971). For example, the child of 12 to 48 months might be a far superior learner of the phonemes of a language than a child of six years, and the older child may be within the age range where the potential semantic learning is at a peak. This phenmenon is not restricted to just young children. An example from Williams' discussion of communication behaviors (1971) will be of value here. A college student is a poor learner of new language sounds. Learning new words is usually restricted to specialized vocabulary. On the other hand, his syntactic level may be quite high. As compared with the two-year old, learning an entirely new language is for the college student a feat comparable to the two-year old's learning to drive a car.

In learning a new language, another aspect of tranformational grammar should be noted: the knowledge that every language has the same basic grammatical categories. Using this information in instructional strategies may facilitate learning and understanding of that new language. This possibility however has yet to be determined. Nevertheless, it is an intriguing approach.

Still another precept of transformational grammar that the teaching profession can utilize to its advantage is that language is a set of rules which allows for an infinite number of utterances. If instruction in language is to parallel the natural development of its acquisition, then teachers should provide their students with guided practical experiences from which they can induce the underlying rules. This procedure is a welcome alternative to the use of pattern drills, and the memorization and pronunciation of isolated words (Williams, 1971).

It should not be thought that limiting this procedure to the school system is being advocated herein. Film programs, recordings, and particularly, television shows which are devoted to the child audience can easily adopt this method, if competent people can provide the information and experiences.

One final implication of research in the child's language code is of practical import and should not be overlooked. Evidence in transformational grammar indicates that the child learns transformations from his linguistic environment (DeVito, 1970, McNeill, 1970). Consequently, the teacher is confronted with determining if two codes are different or if there is some problem or delay in two similar coding systems. If the teacher can determine that there are two different codes in display, then he will not need to allocate energy and time in trying to change, improve, or correct the code. Needless to say, this would have particular

relevance for those teachers working in classes having a mixture of ethnic backgrounds.

A final word needs to be said about the nature of transformational grammar. While it does appear to offer a workable context for our discussion of the child's syntax, it is in no way complete or devoid of errors. Some of the details are no doubt needlessly complicated. While future study will improve this, teachers and researchers need not delay in utilizing transformational grammar in their instruction. As Owen Thomas (1965) has noted in his discussion of transformational grammar and teachers of English, "teachers have an obligation to teach 'living English' and transformational grammar offers one theory of how English lives." To this one can only add that the implications of transformational grammar for any teacher should also be analyzed to their full potential, and hopefully field-tested in the classroom. In this way, conflicts and unnecessary difficulties with the theory can be spotted, re-thought, and clarified, so that the development and manifestation of the language code of the child can be determined more precisely. Continuing research can thus take a lesson from transformational grammar: the process of gradual differentiation is not yet complete.

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Figure 1. The Structure of a Transformational Grammar

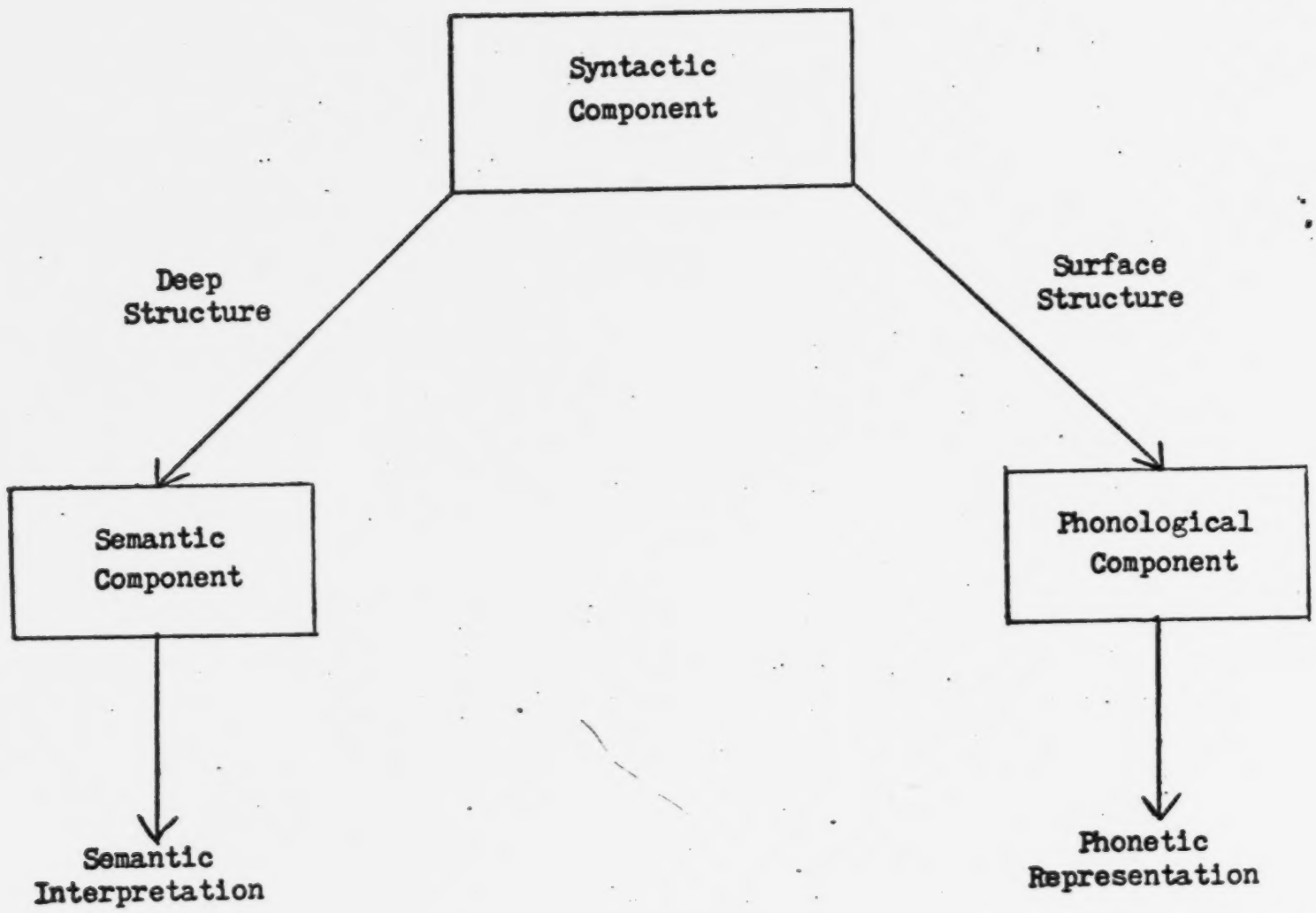

Table 1. Phrase-Structure Rules for a Simplified Grammar

(i) S ⟶ NP + VP
(ii) NP ⟶ det + N
(iii) det ⟶ the, a
(iv) N ⟶ boy, girl, car, dog, cat
(v) VP ⟶ V + NP
(vi) V ⟶ hit, watch, love
(vii) aux ⟶ past, will, should

Figure 2. Deep Structure Generated by Phrase-Structure Rules (i)-- (vii)